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NOTES ON CONNECTICUT LICHENS.¹

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THE "Catalogue of the Lichens of Connecticut," recently published by Miss Rose Meyrowitz and the writer,² with the collaboration of Mr. G. K. Merrill, of Rockland, Maine, gave an enumeration of the species known from the State at the close of 1925, with the citation of the towns where each species had been found. During the year 1926, the writer continued his explorations for lichens, as opportunity offered, visiting a number of towns from which no species had previously been reported. On several of his excursions he again profited by the kind coöperation of Dr. G. P. Clinton, of the Connecticut Agricultural Experiment Station, and was thus enabled to collect material in certain more or less remote localities. On another occasion, in company with Mr. F. A. Musch, of New Haven, the region near the mouth of the Connecticut River was studied. The most extensive collections, however, were made in Greenwich, Stamford, and other towns in the southwestern part of the State.

The present paper, in which the results of the 1926 season are recorded, represents a supplement to the Catalogue. The reports for the towns of Old Lyme, Old Saybrook, and Westbrook should be accredited to Mr. Musch and the writer; all the other reports (except in the few cases indicated), to the writer alone. The generous assistance of Mr. Merrill has again been given, and specimens definitely determined by him are marked (as in the Catalogue) by the letter "M." in parentheses. The records thus designated, however, give but an incomplete idea of his help, since nearly all the other

¹ Contribution from the Osborn Botanical Laboratory.

² Connecticut Geol. and Nat. Hist. Survey, Bull. 37. February, 1927.

records have been verified by him, although based on the writer's determinations.

The sequence of genera in the list below follows that of Zahlbruckner in the second edition of Engler and Prantl's "Die natürlichen Pflanzenfamilien." In the Catalogue the first edition was followed, since the second was not then available. Fortunately the only difference between the two, so far as the lichens of Connecticut are concerned, is in the position of the families Ephebaceae, Collemaceae, Pannariaceae, Stictaceae, and Peltigeraceae. In the first edition this group of families follows the Acarosporaceae; in the second it precedes the Lecideaceae. The Ephebaceae and Pannariaceae are not represented in the list, but the other three families are represented by the genera *Leptogium*, *Lobaria*, and *Peltigera*, respectively. For the sake of brevity the names of the families and higher groups are omitted, since these are given in full in the Catalogue.

The lichens listed include two species of *Lecanora* and a form of *Cladonia cristatella* which are proposed as new by Mr. Merrill. The descriptions of these new lichens, at the writer's request, were prepared by Mr. Merrill, and the reports from stations outside Connecticut have been largely compiled from his notes. The type specimens are in the Merrill Herbarium.

DERMATOCARPON AQUATICUM (Weis) Zahlbr. Greenwich and Stamford.

DERMATOCARPON HEPATICUM (Ach.) Th. Fr. Darien, the second station for Connecticut.

DERMATOCARPON MINIATUM var. COMPLICATUM (Lightf.) Th. Fr. Darien and Woodbridge.

PYRENULA NITIDA (Weig.) Ach. Stamford.

TRYPETHELIUM VIRENS Tuck. Branford, Kent, New Canaan, and Stamford. The only record for this species in the Catalogue was quoted from Hall's report and was based on specimens collected by Barron at Wallingford. These specimens were not seen by the authors. The 1926 material grew on several different kinds of trees.

ARTHONIA LECIDEELLA Nyl. Norwalk and Old Saybrook. Only one station for this species is given in the Catalogue.

ARTHONIA RADIATA (Pers.) Ach. Kent, the fourth station for Connecticut.

GRAPHIS SCRIPTA f. RECTA (Humb.) Nyl. Old Saybrook and Stamford.

GRAPHIS SCRIPTA f. VARIA Leight. Stamford (M.).

CROCYNIA LANUGINOSA (Ach.) Hue. Greenwich, Hamden (*L. Sudbury*), and Stamford.

DIPLOSCHISTES SCRUPOSUS (L.) Norm. Cornwall.

LEPTOGIUM TREMELLOIDES (L. f.) S. F. Gray. Southbury.

LOBARIA AMPLISSIMA (Scop.) Arn. New Canaan.

PELTIGERA APHTHOSA (L.) Hoffm. Stamford.

PELTIGERA CANINA (L.) Hoffm. Cornwall and Stamford.

PELTIGERA POLYDACTYLA (Neck.) Hoffm. Stamford (M.).

PELTIGERA RUFESCENS (Neck.) Hoffm. Salisbury.

LECIDEA ALBOCAERULESCENS (Wulf.) Ach. Cheshire (*Musch*), Darien, Greenwich, New Canaan, New Haven, North Branford (*Musch*), Salisbury, Southbury, and Stamford. The specimens from Cheshire and North Branford were collected in 1925 but, by an oversight, were not reported in the Catalogue.

LECIDEA CYRTIDEA Tuck. Greenwich (M.), the third station for Connecticut.

LECIDEA GRANULOSA (Ehrh.) Schaer. Salisbury (M.). These specimens grew on earth among rocks; the two reported in the Catalogue were lignicoline in habit.

LECIDEA GREGARIA Merrill. Darien and Greenwich. This species, which was proposed as new in the Catalogue, has now been found in five Connecticut towns but is not yet known outside the State.

LECIDEA PLATYCARPA Ach. Cornwall, the third station for Connecticut.

LECIDEA VERNALIS (L.) Ach. New Canaan, Salisbury, and Stamford.

BACIDIA ATROGRISEA (Del.) Arn. New Canaan (M.), the second station for Connecticut.

BACIDIA UMBRINA (Ach.) Branth & Rostr. Branford and Darien. This species is now known from four Connecticut towns.

RHIZOCARPON CONFERVOIDES DC. Cornwall and Guilford.

RHIZOCARPON EUPETRAEUM (Nyl.) Zahlbr. Southbury (M.) and Stamford (*Britton & Evans*, M.). This species is now known from four stations in Connecticut.

RHIZOCARPON GRANDE (Floerke) Arn. On rocks. Stamford (*Britton & Evans*, M.). New to Connecticut.

BAEOMYCES ROSEUS Pers. Greenwich, Meriden (*Musch & Nichols*), and Old Lyme.

CLADONIA BACILLARIS f. CLAVATA (Ach.) Wainio. Kent.

CLADONIA BORYI f. RETICULATA (Russ.) Merrill. Darien (M.), the second station for both species and form from Connecticut.

CLADONIA CAESPITICIA (Pers.) Schaer. Greenwich, Milford, and Orange. Only one Connecticut station for this species is reported in the Catalogue.

CLADONIA COCCIFERA var. PLEUROTA (Floerke) Schaer. Greenwich, the second Connecticut station for this variety and the fourth for the collective species.

CLADONIA CRISTATELLA Tuck. Cornwall, Darien, Meriden (*Musch & Nichols*), Milford, North Haven, and Orange.

CLADONIA CRISTATELLA f. **abbreviata** Merrill, f. nova.

"Thallus well developed and characteristic of the species. Apothecia appearing as if epiphyllous, but podetia sufficiently distinct on careful examination, short, or very short, 1-3 mm. high, the cortex thin, smooth and light colored."

On rotting wood and on banks. FLORIDA: Sanford (*S. Rapp*), TYPE. CONNECTICUT: Milford (*Evans*).

CLADONIA CRISTATELLA var. VESTITA Tuck. Greenwich and Kent (M.). The material from the second station, as determined by Mr. Merrill, represents a passage-form between the species and the variety.

CLADONIA DELICATA (Ehrh.) Floerke. Kent and Orange. Only two stations for this species are given in the Catalogue.

CLADONIA DIDYMA (Fée) Wainio var. MUSCIGENA (Eschw.) Wainio. On decayed wood. Guilford (M.). New to Connecticut. The present material is scanty and is mixed with *C. ochrochlora* m. *ceratodes*.

CLADONIA FIMBRIATA (L.) Fr. f. FIBULA Ach. On banks. Guilford (M.) and Stamford (M.). Hall¹ reported "*C. fimbriata*" from Connecticut and Mr. Merrill doubtfully referred his specimens (which were collected in Killingworth) to f. *fibula*. Owing to their uncertainty and to the fact that *C. fimbriata* is to be regarded as a "composite" species, Hall's specimens were not mentioned in the Catalogue.

CLADONIA FOLIACEA var. ALCICORNIS (Lightf.) Schaer. Southbury (M.), the second Connecticut record for this species and variety. In his report on the specimens Mr. Merrill remarks that "very little of the material found in this country compares with the robust European exhibits."

CLADONIA FURCATA (Huds.) Schrad. Woodbridge.

CLADONIA FURCATA var. RACEMOSA m. PINNATA (Floerke) Wainio. Kent.

CLADONIA GLAUCA Floerke. Cornwall.

CLADONIA MACILENTA Hoffm. var. STYRACELLA (Ach.) Wainio. On banks. Stamford (M.), the first Connecticut record for the variety. "*C. macilenta*," however, was cited from Connecticut by Wood,² on the basis of specimens collected at Sharon by Green. Since the species is "composite" and since the Sharon specimens were not available for examination, no reference to *C. macilenta* was made in the Catalogue.

CLADONIA MITRULA Tuck. Milford and Orange.

CLADONIA OCHROCHLORA m. CERATODES (Floerke) Wainio. Branford (M.), Greenwich (M.), Milford (M.), and New Canaan (M.). The specimens from Greenwich, as noted by Mr. Merrill, lack apothecia and show an "alien thallus."

¹ Amer. Nat. 11: 173. 1875.

² Torrey 14: 80. 1914.

CLADONIA OCHROCHLORA m. TRUNCATA Floerke. New Canaan (M.), the second Connecticut station for this form.

CLADONIA PITYREA f. SCYPHIFERA (Del.) Wainio. On earth over rocks. Greenwich (M.), the first Connecticut station for this form and the second for the species in a collective sense.

CLADONIA PYXIDATA var. CHLOROPHAEA Floerke. Cornwall, Greenwich, and Meriden (*Musch & Nichols*).

CLADONIA PYXIDATA intermediate between vars. CHLOROPHAEA and NEGLECTA. Darien (M.).

CLADONIA RANGIFERINA (L.) Web. Barkhamsted and Cornwall.

CLADONIA SQUAMOSA m. PHYLLOCOMA (Rabenh.) Wainio. Salisbury.

CLADONIA SQUAMOSA f. SQUAMOSISSIMA Floerke. New Canaan (M.), the first Connecticut station for this form.

CLADONIA SUBCARIOSA Nyl. Greenwich (M.), the second town in Connecticut from which this species has been reported.

CLADONIA SYLVATICA f. LAXIUSCULA Del. Barkhamsted, Greenwich, and Southbury.

CLADONIA UNCIALIS f. DICRAEA (Ach.) Wainio. Barkhamsted, Cornwall, Old Lyme, and Salisbury.

STEREOCAULON DENUDATUM Floerke var. CAESPITOSULUM Nyl. On earth over rocks. Salisbury (M.), the first Connecticut record for this species.

STEREOCAULON PASCHALE var. CONGLOMERATUM Fr. On a stone wall. Cornwall (M.), the first Connecticut station for this variety.

GYROPHORA DILLENII (Tuck.) Müll. Arg. Barkhamsted.

GYROPHORA MUHLENBERGII Ach. Barkhamsted, Cornwall, and Salisbury.

UMBILICARIA PUSTULATA var. PAPULOSA (Ach.) Tuck. Barkhamsted and Salisbury (*Britton*).

BIATORELLA SIMPLEX (Dav.) Branth & Rostr. Darien and Old Lyme (M.).

ACAROSPORA FUSCATA (Schrad.) Arn. Old Lyme.

PERTUSARIA AMARA (Ach.) Nyl. Old Saybrook, the fourth station for Connecticut.

PERTUSARIA CEUTHOCARPA (Sm.) Turn. & Borr. New Haven and Roxbury. This species, reported for the first time from America in the Catalogue, is now known from four stations in Connecticut.

PERTUSARIA MULTIPUNCTA (Turn.) Nyl. Barkhamsted and Greenwich.

PERTUSARIA PUSTULATA (Ach.) Nyl. Kent (M.).

LECANORA BOCKII Th. Fr. Old Lyme (M.), the second station for Connecticut.

LECONORA CINEREA (L.) Sommerf. Southbury.

LECONORA GIBBOSA (Ach.) Nyl. Darien (M.) and Old Saybrook (M.). The species is now known from four Connecticut towns.

LECANORA PALLIDA (Schreb.) Schaer. Old Saybrook.

LECANORA riparia Merrill, sp. nov.

"Saxicoline form. Thallus spreading, imposed on a whitish hypothallus and thus quasi-effigurate, thin with the hypothallus here and there visible, or thickened and granulose-verruculose, gray, sordid-gray, or cinereous; KOH \pm , CaCl $-$. Apothecia variable in size, 1-4 mm. in diameter, round with an entire or subcrenulate thalline margin, the disc reddish brown to chestnut, plane with a conspicuous margin or convex with the margin reflexed. Spores 8-nae, 13-17 \times 7-10 μ , ellipsoid with a thickened epispore; asci inflated; paraphyses somewhat thickened, unbranched. Hymenial gelatine I + blue, the color persisting except in thin sections, then wine-red. On various rocks and ledges, in every case just above the water level in tidal rivers or inlets, at times submerged or within reach of spray.

"Lignicoline form. Thallus spreading, in forms liable to submergence inconspicuous, when found on drifted wood in a situation at or above the upper limit of tidal influence, commonly somewhat thickened and verruculose-granulose. Apothecia 1-4 mm. in diameter, the margin conspicuous and flexuous or round and entire. Spores and other internal characters as in the rock forms.

"Corticoline form. Thallus commonly slightly thickened, but in other respects resembling in all of its characters the lignicoline states."

MAINE: "on schistose rocks," Rockport (*Merrill*), TYPE; "on greenstone," North Haven (*Merrill*); "on calciferous schist, and also on fence posts, erect or thrown down in a muddy flat," Cushing (*Merrill*); "on peridotite," Freeport (*A. H. Norton*); "on decorticated trees and shrubs of a sea-cliff," Matinicus Island (*Merrill*); "on dead wood, near level of water in a tidal stream," Thomaston (*Merrill*), distributed in *Lichenes Exsiccati*, No. 24. CONNECTICUT: on rocks and on an old post near salt water, Old Lyme (*Evans & Musch*); on rocks and on oak trees near the beach, Darien (*Evans*). WASHINGTON: "decorticated logs in a tide-flat," Sequim Bay (*J. M. Grant*); "decorticated drift logs," Dungeness (*A. S. Foster*).

"Very near *Lecanora subfusca* var. *campestris* Schaer., but the apothecia average larger and the paraphyses are thicker; the halophytic habit, moreover, argues for distinctness."

LECANORA SUBFUSCA (L.) Ach. Southbury (M.); two specimens, one from bark being "near v. *chlarona*," and the other from rocks representing a "forma," according to Mr. Merrill.

LECANORA SUBFUSCA var. **CAMPESTRIS** Schaer. Southbury, the second town in Connecticut from which this variety has been reported.

LECANORA subpallida Merrill, sp. nov.

"Plant corticoline. Thallus orbicular, sub-effigurate, imposed on a white hypothallus, sordid cinereous, more or less smooth and even, or granulate, or verruculose-granulate, the granules small; KOH + > crimson. Apothecia small to at length medium, borders ir-

regularly flexuous, plane with a distinct thalline margin, or tumid and convex with the margin decurved, commonly gray or caesious-pruinose. Spores 8-nae, ellipsoid with a thickened spore wall, $12-16 \times 6-7 \mu$; asci ventricose."

"Widely diffused on the bark of various trees but not recognized, often identified as a sordid *Lecanora pallida*;" rarely on old wood. MASSACHUSETTS: Wareham (*C. A. Robbins*), TYPE; Ellis (*G. P. Clinton*). CONNECTICUT: Old Lyme (*Evans & Musch*). ALABAMA: Millersville (*Pollard & Maxon*); Fairhope (*Evans*). BRITISH COLUMBIA: Goldstream, Vancouver Island (*J. Macoun*). CALIFORNIA: Santa Catalina Island (*L. W. Nuttall*).

LECANORA VARIA (Ehrh.) Ach. Darien, Old Lyme, and Old Saybrook.

OCHROLECHIA TARTAREA (L.) Mass. Stamford (M.)

CANDELARIELLA VITELLINA (Ehrh.) Müll. Arg. Branford, Cornwall, Darien, Milford, and Old Lyme.

PARMELIOPSIS ALEURITES (Ach.) Cromb. Barkhamsted, Cornwall, Old Lyme, and Orange.

PARMELIA AURULENTA Tuck. Greenwich, Guilford (M.), New Canaan (M.), and Stamford (M.). Only one collection of this species was reported in the Catalogue.

PARMELIA CAPERATA (L.) Ach. Barkhamsted, Greenwich, New Canaan, Norfolk, Old Lyme, Old Saybrook, and Southbury.

PARMELIA CONSPERSA (Ehrh.) Ach. Norfolk, Southbury, and Stamford.

PARMELIA CONSPERSA f. ISIDIATA (Anzi) Hue. Darien, Greenwich and Woodbridge.

PARMELIA OLIVARIA (Ach.) Hue. Kent and Salisbury.

PARMELIA PERFORATA (Jacq.) Ach. Old Lyme.

PARMELIA PHYSODES (L.) Ach. Cornwall and Old Lyme.

PARMELIA RUDECTA Ach. Branford, Cornwall, Kent, New Canaan, Norwalk, Old Saybrook, Southbury, and Stamford.

PARMELIA SAXATILIS (L.) Ach. Cornwall, the fifth station for Connecticut.

PARMELIA SUBAURIFERA Nyl. Cornwall and Old Lyme.

PARMELIA SULCATA Nyl. Greenwich (M.), New Canaan, Norfolk, Old Lyme, Salisbury, and Stamford.

PARMELIA TILIACEA var. SUBQUERCIFOLIA (Hue) Merrill & Burnham. Old Saybrook (M.), the third station in Connecticut for this variety.

PARMELIA TILIACEA var. VICINIOR (Hue) Merrill. Kent, the third town in Connecticut from which this variety is now known.

CETRARIA OAKESIANA Tuck. Salisbury (M.), the third station for Connecticut.

NEPHROMOPSIS CILIARIS (Ach.) Hue. Cornwall (M.).

ALECTORIA CHALYBEIFORMIS (L.) S. F. Gray. Norfolk and Old Lyme.

CALOPLACA AURANTIACA (Lightf.) Th. Fr. Norwalk and Old Lyme.

CALOPLACA AURANTIACA var. ERYTHRELLA (Ach.) Nyl. Darien and Roxbury (M.).

CALOPLACA CERINA var. SIDERITES (Tuck.) Merrill & Burnham. Darien (M.) and Kent (M.).

CALOPLACA PYRACEA (Ach.) Th. Fr. Old Saybrook, the fourth Connecticut station for the species.

XANTHORIA LYCHNEA (Ach.) Th. Fr. Greenwich, Norwalk, Old Saybrook, Salisbury, Southbury, and Stamford.

XANTHORIA PARIETINA (L.) Th. Fr. Old Saybrook.

BUELLIA COLLUDENS (Nyl.) Tuck. On rocks. Southbury (M.). The specimens are not typical but are referred provisionally to this species by Mr. Merrill. This is the first record for Connecticut.

BUELLIA CONSPIRANS (Nyl.) Wainio. Kent and Old Saybrook.

BUELLIA DISCIFORMIS var. SAXICOLA Oliv. On rocks. Greenwich (M.) and Old Lyme (M.). The variety is new to Connecticut.

BUELLIA MYRIOCARPA (DC) Mudd. Old Saybrook.

RINODINA OREINA (Ach.) Mass. Cornwall, Darien, Old Lyme, and Westbrook.

RINODINA SOPHODES (Ach.) Th. Fr. On rocks. Woodbridge (M.), the first definite Connecticut record for the species. As shown in the Catalogue *R. sophodes* var. *confragosa*, as listed by Hall, is now regarded as a distinct species, under the name *R. confragosa* (Ach.) Koerb.

PYXINE SOREDIATA (Ach.) Th. Fr. Norwalk, Southbury, and Stamford.

PHYSCIA AQUILA var. DETONSA (Fr.) Tuck. Kent and Stamford.

PHYSCIA OBSCURA var. ENDOCOCINA (Koerb.) Th. Fr. Barkhamsted, Branford, Cornwall, Greenwich, Kent, Old Lyme, Orange, Salisbury, and Southbury.

PHYSCIA OBSCURA var. VIRELLA Leight. On trees. Barkhamsted, the first Connecticut record for this variety.

PHYSCIA PULVERULENTA var. LEUCOLEIPTES Tuck. On trees. Old Saybrook (M.), Norwalk (M.), and Southbury (M.). This variety is here reported from Connecticut for the first time.

PHYSCIA STELLARIS (L.) Nyl. Cornwall, Greenwich, New Canaan, Norwalk, Old Lyme, Old Saybrook, Southbury, and Stamford.

PHYSCIA STELLARIS var. AIPOLIA Nyl. On trees. Greenwich (M.), the first Connecticut station for this variety.

PHYSCIA TENELLA (Scop.) Nyl. Old Saybrook.

PHYSCIA TRIBACIA (Ach.) Nyl. Darien, Greenwich, New Canaan, Norwalk, Old Saybrook, Southbury, and Stamford.

ANAPTYCHIA SPECIOSA (Wulf.) Wainio. Kent, the fifth station for Connecticut.

In the Catalogue 301 "lichen-forms," representing 231 distinct species, are enumerated. The additions included in the preceding

list increase the number of lichen-forms, now known from the state, to 318 and the number of species to 240.

In the Catalogue records from 79 Connecticut towns were given, leaving 90 towns from which no reports on lichens had been received. The explorations of 1926 give records from 9 additional towns, reducing the number still to be heard from to 81. In the Catalogue the towns from which 10 species or more had been reported numbered 36; to these towns the following, 7 in number, may now be added: Greenwich, Kent, New Canaan, Old Saybrook, Salisbury, Southbury, and Stamford. The 5 towns standing at the head of the list, with the number of species recorded from each, are as follows: Killingworth, 95; Guilford, 53; New Haven, 52; Bethany, 51; and Washington, 46.

In the Catalogue only 5 species were reported from 20 or more towns apiece, while 22 were reported from 10 to 20 towns apiece. These numbers may now be raised to 10 and 27, respectively. The 10 leading species of the state, according to the present records, with the number of towns from which each species has been reported, are the following: *Parmelia caperata*, 36; *P. rudecta* and *Physcia stellaris*, 30 each; *Cladonia cristatella* and *Parmelia conspersa*, 28 each; *Physcia obscura*, 26; *Ph. tribacia*, 24; *Cladonia furcata*, *C. sylvatica*, and *Lecidea albocaerulescens*, 21 each. In the Catalogue the leading species, *Parmelia caperata*, had only 29 towns to its credit. The species, additional to those noted in the Catalogue, which are now known from 10 or more towns apiece, are the following: *Alectoria chalybeiformis*, *Candelariella vitellina*, *Cladonia rangiferina*, *C. uncialis*, *Dermatocarpon aquaticum*, *Gyrophora Muhlenbergii*, *Pertusaria pustulata*, *Physcia aquila*, *Ph. pulverulenta*, and *Rinodina oreina*.

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EFFECTS OF POST-PLEISTOCENE SUBMERGENCE IN EASTERN NORTH AMERICA.

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(Continued from p. 93.)

HALOPHYTES OCCURRING ON THE ATLANTIC COAST AND IN THE SALINE REGIONS OF WESTERN NORTH AMERICA.

Before discussing the Champlain Sea as a means of dispersal of halophytes, it may be well to consider the distribution of halophytes